

# NOTES ON THE BIRDS OF PARÁ, BRAZIL

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## PART I.—INTRODUCTION.

Belem or Pará is a city of about two hundred thousand inhabitants. It is a hundred miles from the sea, on the south bank of the Amazon delta, and only one hundred and sixty kilometres south of the equator, built on low swampy land. The birds in the vicinity have been collected assiduously and offer little chance of novelty to the transient ornithologist.

During the first part of May of the present year I had the opportunity of spending a little time in the jungle in the immediate suburbs of Pará. Through the courtesy of the Governor and of Dr. Snethlage I was given the use of a house at the water-works, in a large restricted area of jungle known as Utinga, and here every facility was afforded for collecting and study. Unexpectedly meeting Mr. George K. Cherrie, who had just come down the Amazon, I prevailed upon him to share our opportunities and with my companion Mr. G. Inness Hartley, spent a few days together. I found the region to be of much greater interest than I had expected and by resorting to a rather novel method of observation I obtained a new angle upon life in these tropical lowlands, and one which profoundly impressed me as to future possibilities in this direction.

## PART II.—GENERAL ECOLOGY.

The Utinga water-works consisted of a pumping station from which radiated long open cement water-ways and closed pipes leading straight through the jungle. The light jungle began at the very edge of the small clearing which was within a few minutes' walk of the tram line leading directly back to the heart of the city.

It was without question quite the hottest, most humid tropical place I have ever encountered. I qualify with humid as I have known the dry heat of India to be much greater, as 110° F. at eleven P. M. at Agra. But this moist heat was in excess of any corresponding temperature I have known in Malaysia, Borneo, Mexico or elsewhere. It was the rainy season and the first day of our stay bore out the reputation of Pará for precipitation, the rain pouring down much of the day. During all of the remainder of our stay, the weather was ideal, clear until about 2:30 P. M., when dark clouds and wind came up, the rain continuing until 4 P. M. On only one day it rained for twenty minutes in the morning, with the afternoon shower as usual. The nights were, of course, cool.

Birds were most abundant from 8 to 10 A. M. and 2 to 5 P. M. while at mid-day, all songs and chirps ceased and only the occasional note of an insect broke the stillness.

Most of the birds had just passed the breeding season, and a goodly proportion of those secured were full-grown young. Both young and adults were molting or just completing the molt. In general they corresponded to our northern birds in August and September. A few, however, were preparing to nest and several were building. Blue tanagers had a nest a few yards from our house with two young which flew on May 8th. Yellow-backed caciques had several small colonies in isolated trees near native houses and were breeding.

Much of the land between the small streams or igarapés was marshy and covered with an almost impenetrable cover of undergrowth. Occasionally a slight rise resulted in dry ground and here the growth became higher, more open and assumed the general character of almost primitive tropical jungle. A narrow trail opened into jungle of this character only a few yards from our house in the pumping-station clearing. It led straight northwards for about two hundred yards when it ended in open, overgrown fields. Along this trail the undergrowth was fairly dense, with here and there a giant buttressed tree, surrounded by lesser trees of many species.

On the first tramp I took in the jungle I noticed a number of small birds in the upper branches of a tree which grew alongside of this trail. Not until I had passed that way several times did I come to realize that this particular tree had some powerful attraction for birds of many species. Knowing the shortness of time at my disposal I determined to concentrate my efforts on this tree which was a species of wild cinnamon. The present paper has to do chiefly with the facts thus obtained.

Once having our attention called to this bird tree, Mr. Hartley and I kept on the watch for others. Several hundred yards away along a pipe line we discovered another. It was a real giant, towering high above all the surrounding growth and we named it the toucan tree as it appeared to be especially attractive to these birds. It was covered with an abundance of good-sized scarlet fruit, the size of which accounted for the presence of medium and large birds such as toucans, caciques, trogons and kiskadees, instead of smaller callistes and flycatchers. A third berry-laden tree half a mile to the eastward straight through the jungle, bore oblong, yellow-skinned fruit appealing especially to woodpeckers and flycatchers, and from the brief glimpses we had as we passed, the constant abundance of birds would have furnished as interesting a list here as at the tree near our house.

I began my study of bird-life in the wild cinnamon tree by stealthy approaches, working my way through the jungle until I was close underneath. I soon found that this was quite unnecessary, as the birds among the upper branches paid no attention either to me or the sound of my gun. Three hours of constant observation beneath the tree resulted in many hours of pain from strained neck muscles. On the third day I brought out a canvas steamer chair and placing it in the trail at a convenient spot, found it to be ideal for observation. I could recline so that looking straight upward was no effort. With gun on my knees, glasses around my neck, note-book and dead birds on a stump within reach, I had discovered a truly *de luxe* method of tropical bird study. The biting flies, gnats and mosquitos made it impossible to sit absolutely quiet for more than a minute, and the ants soon found the legs of the chair gave easy access

to one's person. On the whole, however, I was too much absorbed in the novelty of the method of work and its unexpected results to give any thought to these annoyances.

The principal jungle bloom was the heliconias, whose scarlet, jagged spikes glowed brightly against the dark foliage. Variegated leaves were abundant and when the slanting sun struck through the jungle, it often appeared vivid with color. The jungle about my seat was, of course, more or less impoverished by the nearness of the city and the presence of the water-works. Black capuchin monkeys of more than one species were hereabouts and I saw as many as nine in a band. Three-toed sloths were common as were agoutis and small squirrels. But during my periods of watching no mammal came near the tree.

The more frequent sounds were the common ones of light jungle, Tinamou called and answered one another, gold-birds lifted their wonderful voices far away in the forest, toucans yelped, caciques squeaked and gurgled overhead, cicadas shrilled and buzzed and great bees and hummingbirds whirred past. The commonest cicada had a note like a person calling a cat *puss-puss-puss* kept up interminably in a high soprano. Another had a shrill, strident note which, when it gained full strength, quavered and broke into two alternating tones, which finally ran together into a true trill. After the daily rain, the tiniest of frogs would each strike up a single, shrill note, unceasingly reiterated. The most memorable sounds were the deep, guttural voices of great frogs hidden in the igarapés, who reiterated the never answered syllable, wh——y? wh——y?

My business was chiefly with the birds which I could observe from my canvas seat. I spent from two to six hours each day for a period of one week in the immediate vicinity of the tree and during that time identified ninety-seven species of birds, none of which were more than a few yards from the trail. A further division of these is as follows:

Aerial species flying overhead .....	7
Birds of the surrounding jungle .....	14
Birds observed in the tree .....	76



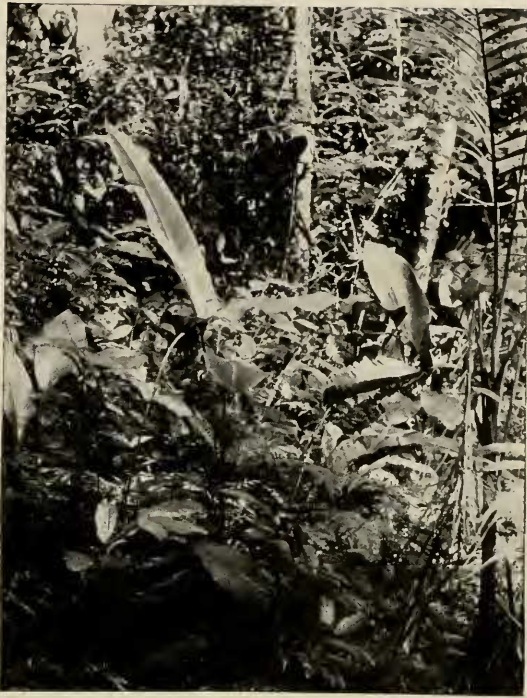


FIG. 13. UTINGA JUNGLE FOREGROUND



FIG. 14. PARASOL ANTS ON THE MARCH



I shall reserve the details of the various species until later pages, and here give only a résumé of the more general points of interest.

Of the seven aerial species, one was a vulture, one a night-hawk, one a swift and four were swallows. These all came into view at one time or another across the patch of sky visible beyond the upper branches of the tree. Now and then birds of prey appeared, but at such great elevations that I was unable to identify them.

The fourteen birds of the surrounding jungle may be divided thus: one tinamou, dove, woodpecker, kingfisher, trogon, ani and woodhewer, two antbirds, two flycatchers and three finches. In one or two instances these were birds of adjoining fields which had strayed a little way into the undergrowth. The majority, however, were typical of the lower jungle strata, either terrestrial or living in the low undergrowth.

This series of strata of bird life visible to me as I sat quietly hour after hour was very striking, a phenomenon which would never come to one while moving about through the jungle. Bound to the ground were the tinamou, and almost as terrestrial were the rustling ground doves. In the lower underbrush finches, *Synallaxis* and antbirds moved restlessly; a little higher manakins whirred about and woodhewers hitched up the trunks. Then came the birds of the upper branches, callistes, tanagers, flycatchers, toucans and parrakeets. Then the low flyers—the swallows, martins, swifts and nighthawks, and finally the vultures, hanging like the faintest of motes in the sunlight high above the earth.

### PART III.—CANELLA DO MATTO AND ITS BIRD LIFE.

The tree which I have already mentioned grew only about one hundred yards from our house at the pumping station and within five minutes' walk of the Pará tram line. It was at the side of a jungle trail, which, while seldom traversed by natives, was kept clear of vegetation by the workmen at the pumping station. It was smooth-barked, richly decorated with lichens and while only about fifteen inches in diameter at a man's height

above the ground, it was very tall in proportion. The first branches were small, mostly dead and about fifty or sixty feet up. From this point the trunk split into lesser divisions and lifted its topmost foliage into the full tropical light and heat a hundred and ten feet above the ground. The berries were small, round and three-parted and, like the leaves, slightly acrid, with a spicy, aromatic flavor.

A few minutes after dawn I have counted eight birds in the tree and a half dozen would sometimes linger until dusk. As a rule, however, there were few in sight until 7:30 or 8:00 A. M., after which there would be a continual coming and going until the heat of mid-day drove all to shelter. The larger number of afternoon visitors came after the rain was over. Sunshine had much to do with the presence of the birds, and a cloudy half-hour meant but scanty notes as I sat beneath. With the reappearing of the sun, the birds would again begin to flock from the surrounding jungle.

Abundance of species and relative fewness of individuals is a pronounced characteristic of any tropical fauna. This was beautifully shown by my first two days' collection from the tree, collecting too, which was quite indiscriminate in character, very different from the more careful picking and choosing with which I shot on succeeding days. The first day I secured sixteen birds, all of different species. The second morning I got fourteen, all different, and only one of which was represented in the lot of the previous day. Thus in five hours' time I secured thirty specimens of twenty-nine species. From the entire district of Pará, three hundred and seventy-nine birds have been recorded. In this single tree within a week's time and during a period of intermittent observation I found seventy-six species.

The bird visitors to the tree arrived in one of two characteristic ways. Many came direct and swiftly, singly or in pairs, flying straight and with decision as if from a distance. A hundred yards away in any direction this convergence could frequently be observed, small birds flying over the summit of the jungle revealing a general flight direction treeward. Another method of arrival was wholly casual, loose flocks drifting slowly from the neighboring jungle, sifting into the tree and feeding



FIG. 15. GIANT LAND SNAIL



FIG. 16. NEST OF SAÛBA ANTS





for a time before passing on. When these left it was rather hastily and in answer to the chirps and calls of the members of their flock who had not been beguiled by the berries of this trec and hence had forged steadily ahead.

These more or less well-defined flocks are very typical of all tropical jungles. Little assemblages of flycatchers, callistes, tanagers, antbirds, manakins, woodhewers and woodpeckers are drawn together by some intangible but very social instinct, and unite day after day in these fragile fraternities which drift along, gleaning from leaves, flowers, branches, trunks or ground, each bird according to its structure and way of life. They are so held together by an invisible gregarious instinct that day after day the same heterogeneous flock may be observed, identifiable by peculiarities of one or several of its members. The only recognizable bond is vocal—a constant low calling; half unconscious, absent-minded little signals which keep the members in touch with one another, spurring on the laggards, retarding the over-swift.

At first I found it almost impossible to identify birds unless they were on the lower branches or silhouetted against patches of foliage. When in the upper branches and seen against the sky, birds with under-parts of black, blue or green all looked black. White under plumage appeared grey and buff seemed orange. Even when the tree was filled with the most brilliant callistes, not a bird was visible as long as they were motionless, but when the smallest, most drab of flycatchers moved head or tail I could at once detect it, and distinguish it from the moving leaves about it. Gradually I came to know all the more common species, beginning with the tail-flirting silver-beak tanagers, and before the end of my week's vigil, I seldom made the mistake of shooting a species with which I was already familiar.

While I watched, there came to my tree one species of pigeon, two hawks and two parrots, four hummingbirds and an equal number of toucans and woodpeckers. Fifty-nine were passerine birds of which there were eight each of the families of flycatchers, manakins and cotingas, and eleven tanagers.

Besides the seventy-six species which I positively identified by shooting or observation, I saw at least thirty-three more which eluded me, and of which a hasty glance told no more than that they were of new, and to me, unknown species.

The following is a list of the birds observed actually in the Canella do Matto tree.

#### COLUMBIFORMES 1

Splendid Pigeon, *Columba speciosa* Gmel.

#### ACCIPITRIFORMES 2

Brazilian Black Eagle, *Urubitinga urubitinga* (Gmel.).

Plumbeous Kite, *Ictinia plumbea* (Gmel.).

#### PSITTACIFORMES 2

Tuipara Parrakeet, *Brotogeris tuipara* (Gmel.).

Dusky Parrot, *Pionus fuscus* (Müll.).

#### CORACIFORMES

##### TROCHILIDAE 4

Red-vented Hermit, *Phaethornis ruber ruber* (Linn.).

Great Jacobin Hummingbird, *Florisuga mellivora mellivora* (Linn.).

Amazonian Wood-Nymph, *Thalurania furcata furcatoides* Gould.

Green-breasted Fairy, *Heliothrix auriculata phainolaema* Gould.

#### SCANSORES

##### RAMPHASTIDAE 4

Red-billed Toucan, *Ramphastos monilis* Müll.

Double-collared Aracari, *Pteroglossus bitorquatus bitorquatus* Vig.

Lettered Aracari, *Pteroglossus inscriptus inscriptus* Swains.

Gould's Toucanet, *Selenidera maculirostris gouldii*  
(Natt.).

## PICIFORMES

## PICIDAE 4

Spix's Amazonian Woodpecker, *Celeus jumana jumana*  
(Spix).

Waved Woodpecker, *Celeus undatus multifasciatus*  
(Mahl.).

Malherbe's Black Woodpecker, *Campephilus trachelopyrus* (Malh.).

Amazonian Gold-fronted Piculet, *Picumnus aurifrons*  
Belz.

## PASSERIFORMES 59

## FORMICARIIDAE 1

Sclater's Amazonian Bush-Shrike, *Thamnophilus amazonicus* Scl.

## DENDROCOLAPTIDAE 7

Whiskered Recurved-Bill, *Xenops genibarbis genibarbis* Ill.

Wedge-billed Woodhewer, *Glyphorhynchus cuneatus cuneatus* (Licht.).

Eyton's Fulvous-throated Woodhewer, *Xiphorhynchus guttatus eytoni* (Scl.).

Chestnut-rumped Woodhewer, *Xiphorhynchus pardalotus* (Vieill.).

Picine Woodhewer, *Dendroplex picus picus* (Gmel.).

Layard's Woodhewer, *Picolaptes layardi* Scl.

Buffon's Barred Woodhewer, *Dendrocolaptes certhia certhia* (Bodd.).

## TYRANNIDAE 8

Sulphury Flatbill, *Rhynchocyclus sulphureus*  
(Spix).

- Sclater's Flatbill, *Rhynchocyclus poliocephalus sclateri* Hellm.
- Oily Flycatcher, *Mionectes oleagineus oleagineus* (Licht.).
- Sharp-billed Flycatcher, *Tyranniscus acer* (Scl. and God.).
- Yellow-vented Crested Flycatcher, *Elaenia flavogaster flavogaster* (Thunb.).
- Gaimard's Crested Flycatcher, *Elaenia gaimardii guianensis* Berl.
- D'Orbigny's Black-headed Flycatcher, *Myiarchus tuberculifer* (Lafr. and D'Orb.).
- Azara's Flycatcher, *Empidonomus varius* (Vieill.).

## PIPRIDAE 8

- Banded-tailed Manakin, *Pipra fasciicauda* Hellm.
- Red-headed Manakin, *Pipra erythrocephala rubrocapilla* Temm.
- Slate-breasted Black Manakin, *Pipra leucocilla bahiae* Ridgw.
- Orange-bellied Manakin, *Pipra suavissima* Sol. and God.
- Pará Opal-crowned Manakin, *Pipra opalizans* Pelz.
- Schomburgk's Manakin, *Piprites chlorion* (Cab.).
- Blue-backed Manakin, *Chiroxiphia pareola pareola* (Linn.).
- Eastern White-breasted Manakin, *Chiromachaeris manacus purus* Bangs.

## COTINGIDAE 8

- Cayenne Tityra, *Tityra cayana* (Linn.).
- Red-cheeked Tityra, *Tityra inquisitor erythrogenys* (Selby).
- Little Psaris, *Platypsaris minor* (Less.).
- Cinereous Thickbill, *Pachyrhamphus rufus* (Bodd.).



Lichtenstein's Thickbill, *Pachyrhamphus marginatus*  
(Licht.).

Gold Bird, *Lathria cinerea* (Vieill.).

Schomburgk's Attila, *Attila brasiliensis* (Less.).

Cayenne Chatterer, *Cotinga cayana* (Linn.).

#### TROGLODYTIDAE 2

Swainson's Moustached Wren, *Thryothorus genibarbis*  
*genibarbis* Swains.

Venezuelan House Wren, *Troglodytes musculus clarus*  
Berl. and Hart.

#### TURDIDAE 1

Cabanis's White-throated Thrush, *Planesticus phaeopygus*  
*phaeopygus* (Cab.).

#### VIREONIDAE 3

Chivi Vireo, *Vireo chivi* (Vieill.).

Grey-naped Wood Vireo, *Pachysylvia thoracica semicinnerea*  
(Scl. and Sal.).

Guiana Vireo-Shrike, *Cyclarhis gujanensis gujanensis*  
(Gmel.).

#### FRINGILLIDAE 2

Rothschild's Blue Grosbeak, *Cyanocompsa rothschildii*  
(Bartl.).

Great Saltator, *Saltator maximus* (Müll.).

#### COEREBIDAE 5

Brazilian Flowerpecker, *Coereba chloropyga chloropyga*  
(Cab.).

Turquoise Honey-Creeper, *Dacnis cayana cayana*  
(Linn.).

Black-backed Honey-Creeper, *Dacnis angelica angelica*  
Bonap.

Blue Honey-Creeper, *Cyanerpes cyaneus cyaneus* (Linn.).

Green Honey-Creeper, *Chlorophanes spiza spiza* (Linn.).

#### TANAGRIDAE 11

Blue-backed Green Tanager, *Chlorophonia chlorocapilla* (Shaw).

Northern Violet Euphonia, *Tanagra violacea lichtensteini* (Cab.).

Cayenne Euphonia, *Tanagra cayennensis* (Gmel.).

Pará Blue-bellied Tanager, *Tanagrella velia signata* Hellm.

Spotted Tanager, *Tangara punctata punctata* (Linn.).

White-shouldered Blue Tanager, *Thraupis episcopus episcopus* (Linn.).

Palm Tanager, *Thraupis palmarum palmarum* (Wied.).

Silver-beaked Tanager, *Ramphocelus carbo carbo* (Pall.).

Scarlet-crested Tanager, *Tachyphonus cristatus brunneus* (Spix).

Pará Crested Tanager, *Tachyphonus surinamus insignis* Hellm.

Guira Tanager, *Hemithraupis guira guira* (Linn.).

#### ICTERIDAE 3

Great Green Cacique, *Ostinops viridis* (Müll.).

Yellow-backed Cacique, *Cacicus cela* (Linn.).

Brazilian Red-rumped Cacique, *Cacicus haemorrhous haemorrhous* (Linn.).

The great abundance of birds in this particular tree was due, of course, to the multitude of ripe berries among its foliage. These were the primary cause of attraction. Lacking these, the

birds would have had no special reason for visiting it more than the surrounding jungle. And it was surprising to discover how many of the birds which would usually be considered as fly-catching or insect eaters, had in this case turned frugivorous. It seems worth while to reclassify this arboreal avifauna by the *raison d'être* of their presence.

<i>Feeding on tree berries</i>	Tanagers, 11 Caciques, 3	<i>Casual Visitors</i>
Pigeon, 1	<i>Snail-eater</i>	Hawk, 1
Parrakeet, 1	Hawk, 1	Parrot, 1
Toucanets, 3	<i>Insect-eaters of the trunk</i>	Hummingbirds, 4
Woodpecker, 1	Woodpeckers, 2	Toucan, 1
Flycatchers, 8	Woodhewers, 7	Woodpecker, 1
Manakins, 6	<i>Insect-eater of the branches</i>	Bush-Shrike, 1
Cotingas, 7	Wren, 1	Manakins, 2
Thrush, 1		Cotinga, 1
Vireos, 3		Wren, 1
Finch, 1		Finch, 1
Honey-Creepers, 5		

The greedy, noisy parrakeets were restless jungle birds, shifting from one feeding place to another, always gorging themselves, tearing off bunches of berries and wasting much more than they ate. Of the members of the Ramphastidae, the visitors to this tree were almost wholly toucanets, the smaller, more agile species which found less trouble perching on the rather slender branches. The toucan tree a few hundred yards away, hung its larger fruit on stouter branches and attracted the toucans of larger size.

Without exception all the flycatchers which I observed in the tree—eight species—were feeding on the berries, in spite of their wide gapes and insect-guiding bristles. This was not so surprising in the case of the six manakins and seven cotingas, but the three vireos and five honey-creepers must have been birds of originality to turn thus wholly frugivorous. The tanagers led all in numbers, eleven of them, and were feeding exclusively on the berries, and the same was true of the three caciques.

On the casual visitors it is unnecessary to remark. A wren hunted insects among the upper branches one day, and on another a hawk found a giant snail crawling up the trunk and proceeded to devour it.

The insect-eaters of the trunk were nine in number and showed no interest in the berry harvest. Two were woodpeckers and there were seven species of that interesting tropical family of woodhewers. These birds were abundant at Utinga. Their labor was confined to a careful search for insects on the trunk and larger branches. The smaller woodhewers such as *Xenops* and *Glyphorhynchus* usually drifted to the tree as members of the loose jungle flocks. The larger woodhewers were more independent, and usually seen singly or in pairs. The low, plaintive notes of the little wedge-billed woodhewer were typically like those of the loose flocks, keeping the members in touch with one another.

Woodhewers are the very essence of protective coloring, and their habits of life make of them wandering bits of loose bark, yet because of their constant motion, they are very easy to see even in the dim light of the under jungle. The moment they are quiet they vanish, and the keenest eye in the world could not recognize them. This similarity of dress is a remarkable feature of this whole family; big and little, short and long-tailed, with beaks blunt, sharp, straight, curved, thick or needle-thin. In these characters they differ, by these points they must know one another. But their pattern shows little variation. Their olives or browns almost invariably warm into rich foxy rufous on wings and tail, while over head and shoulders a shower of light streaks has fallen, bits of sunlight fixed in down.

And so came to a close my rambling observations on the bird life of this single Canella do Matto. Within the space of a week I had spent not more than twenty hours of neck-racked, vertical observation, shooting whenever necessary, holding up my glasses until my arms collapsed with fatigue. In return I had been able definitely to identify seventy-six species and to record the presence actually in the tree of at least one hundred.

In point of actual numbers I kept no sustained record, but during one vigil of two hours' length I counted four hundred and sixteen birds in the tree.

When I began I had no conception of such success and as I look back and realize the necessary desultory character of my observations, the list seems even more remarkable. Relay observation on the part of two or three watchers for a correspondingly greater length of time, or closer observation from a blind fixed in a nearby tree, would yield notes of incomparably greater thoroughness and value.

#### PART IV.—NOTES ON SOME INVERTEBRATES NEAR THE CANELLA DO MATTO.

I made no effort, during the short time at my disposal, to carry on any lines of observation, other than upon the avifauna of the one tree. Yet as I walked back and forth along the trail, or sat quietly during the rather rare periods when no birds were in sight, or rambled about in the surrounding jungle and along the overgrown igarapés, I made a few desultory notes on certain invertebrates of especial interest to me as forming the food of jungle birds.

The great land snail, *Strophocheilus oblongus* Müller, we saw now and then, partly hidden in crevices of bark, and early one morning I saw a plumbeous kite in the canella tree, holding the shell of one of these mollusks in his talons and devouring the inmate. The shells were strongly grained, and of a rich brown with salmon-colored mouth. An ordinary sized shell was about four or five inches in length, and when the mollusk was fully extended the whole organism reached seven and a half inches. On a tree-trunk leaning over an igarapé I counted fourteen of these mollusks crowded into one very shallow cavity.

I observed that spiders entered largely into the diet of the birds I examined and I was interested in watching the method of escape of several common species, whose webs were hung along the trail.



*Acrosoma spinosa* Linn., an exceedingly spiny, gaudy spider hung in the center of its web. Its scarlet, yellow and black coloring seemed to indicate an unsavory mouthful, and it was correspondingly slow to take alarm. Its large, round web was swung obliquely within a foot or two of the ground. At the center was a heart-shaped open space in which the spider hung by six legs, the other two being drawn back ready for action. The web slanted backward and the spider hung upside down, the brilliant colors of the upper side of the body being thus completely hidden. When the creature was alarmed, it dropped to the ground along a cable which it attached to the point of the heart-shaped space and paid out as it fell. The moment it touched land, it slipped under a leaf. If no further disturbance ensued it regained its courage in about three minutes, and climbed swiftly, winding in its cable and apparently swallowing it, as it went. When caught in the hand, it turned at once upon its back and feigned death.

A mottled, rectangular, rather flattened and much more toothsome appearing spider was *Epeira audax* Blk. Its lure was usually hung under a stump or a fallen sapling. When disturbed it invariably ran upward from the center of the web to the trunk, where it drew in its legs and squatted. In four instances its resting place was a bit of mossy or lichenized bark, and although in full view, it merged perfectly with its surroundings. So perfectly, indeed, that the eye had to search carefully to rediscover it each time it sprinted to safety.

*Epieira truncata* Keys, was a smallish black spider, with yellowish-white markings on its back. It had still a third place of concealment. Wherever its web was hung, there was always some convenient leaf which the spider had half rolled up, tied fast with web and lined with silk. At the first sign of danger or when heavy rain fell, the architect rushed from the center of the web to the prepared sanctuary.

The commonest spider at Utinga, fat, round, black and beloved by birds was *Eriophora purpurascens*. Unlike all the others its point of vantage was not at the center of its web but in a

pecially prepared den. The web was invariably hung between the leaves of some shrub. At one side, usually above the web and in full view, three leaves were drawn loosely together and fastened. Between these the spider waited for tell-tale web vibrations, and in such places inquisitive antbirds and jungle wrens found and devoured it.

One day a short distance from the tree I watched an indecisive bout between one of these spiders and a small but courageous wasp. The contest must have been going on for some time as about half the web was already destroyed. The spider had left its den and was clinging to the center of the slack structure. The wasp was exerting every effort to destroy the remaining two or three chief supporting cables. She would alight and chew them with all her might. After a few futile attempts, buzzing with rage, she would fly at the strand, seize it in her mandibles, and darting backward in midair, endeavor to snap it. Then she alighted on a nearby leaf and carefully cleaned feet, wings and head.

After such a rest she would turn her attention to the spider itself, buzzing around as closely as she dared, and making sudden rear attacks.

*Eriophora* was never off guard for a moment and raising his grasping feet he offered an invincible front. As the wasp was only a fourth of the size of the spider she dared do nothing more in the line of direct attack. It appeared that all her efforts were directed to cutting the spider down to the ground when she could probably have mastered him. He evidently did not dare to attempt to reach his leaf shelter, and remained quiet, guarding against attacks, swaying in his half demolished web. Before any dramatic crisis could develop, a heavy downpour of rain came on and drove both creatures to shelter.

Caterpillars were abundant at this season and remains of them were found in the stomachs of about one bird in every three. The most noticeable, however, were too well-armed to fear sudden death at the beaks of birds. One appeared on the

smooth bark of *Miconia*, like a great felted mass of long reddish hairs, each of which was a veritable barbed and stinging nettle. This larva has never been reared to maturity, but it is supposed to belong to the Limacodidae. These caterpillars climbed slowly up the trunks, making about ten feet an hour.

Another bizarre larva spent the day hidden on the under side of a banana frond, close to the midrib. It looked like a short, thick, arrow, notched posteriorly, with a rounded, blunt head fringed behind with a row of great spikes. The imago is the moth *Opsiphanes invires*.

A sphingine snake-head caterpillar of the genus *Macloryx* was seen once. It is unquestionably one of the most startling dénouements in nature to see this large, smooth, innocuous looking larva suddenly bend its head forward and down, and transform into a vivid representation of a serpent's head, even to the rapidly playing forked tongue.

The omnipresent saüba ants (*Atta* sp.) forced themselves on the attention of the most casual observer. All day long their interminable lines flowed back and forth from tree-tops to nest, conveying myriads of green leaf burdens. The single point which impressed itself upon me was the large number of ants getting free transportation. Every other leaf had from one to six ants of small size clinging to the swaying frond. Where the leaf was pliable and of large size they had all they could do to maintain their position as it was jerked along. These were doubtless some small form of the saüba citizenry but why the free transportation and what their function was I could not determine.

One of the most remarkable invertebrates which I observed was an aquatic hairy caterpillar. This was found in abundance in shallow pools and creeks. The first one which I saw seemed to be wriggling about in the throes of drowning, having, as I supposed, fallen from the overhanging foliage. I charitably scooped it out and set it to dry on a bit of palm leaf. It attempted to walk away, but in spite of the fact that much of its hairy coat dried at once, it staggered about, toppling over at each step and

appearing more at ease squirming about on its side. Some distance further on I saw a dozen more in an open pool and then, realizing my mistaken kindness, went back and restored the caterpillar to its strange element. It seems that this is the larva of a small moth appropriately named *Palustra*, which has assumed an aquatic life. It swims by vigorous wriggles and uncoilings, and occasionally, like a mosquito larva, comes to the surface. It is not known, however, whether it breathes directly from the surface, or from the air entangled in its hairy coat.

#### PART V.—NOTES ON THE MOLT OF SOME PARÁ BIRDS.

My recent study of the molt, and especially of the tail molt, of pheasants has seemed to yield something of value in dividing these birds into subfamilies.<sup>1</sup> While disclaiming any preconceived belief in the use of this character in other groups, I have nevertheless lost no opportunity to record whatever data I could find in regard to this phenomenon. I intend as rapidly as possible to examine molting birds of all orders and to place the results on record. With this in view I present the facts derived from sixteen species which I examined at Utinga, near Pará, in Brazil in the early part of May. Fragmentary as they are, they show nevertheless that differences exist. Whether these, in some cases, are of only specific distinction, or whether of generic or family value, only future, more extensive investigations can prove.

As regards wing molt, I found only two exceptions to the regular formula of the primaries molting regularly and successively from within out, and the secondaries molting from the outermost inward. In the cotinga, *Platypsaris minor*, the primary molt appeared to be 1-2-3-4-10-5-6-7-8-9. The secondaries had two modes of molt. From the outer to the 4th pair; then from the 5th pair inward and the 12th pair outward, meeting about the 8th pair.

A specimen of *Daenis cayana cayana* showed a similar break in the secondary molt, molting in both wings inward from the outer pair, and outward from the 9th pair, meeting at the 5th or 6th pairs.

<sup>1</sup>Zoologica. Vol. I, No. 15, p. 265.

In attempting to work out tail molt from dried skins in the Museu Goeldi I was impressed with the difficulty of accurate observation. It is almost impossible to examine thoroughly the entire individual rectrices without damaging the appearance of the skin, and the dried sheaths which are so often the sole clue to recent growth, crumble at the first touch of the pliers.

To summarize at once my data taken from fresh, unskinned birds, I record the following types of tail molt:

*Centripetal, from the outside in,*

Ramphastidae (3)

Picidae (1)

*Centrifugal, from the center out,*

Dendrocolaptidae (2)

Vireonidae (1)

Tanagridae (3)

*Other types of tail molt,*

2  
3 > 1-4-5-6 Pipridae (2)

3 — 1-2-4-5-6 Cotingidae (1)

1 <  $\begin{matrix} 2-4 \\ 3-5 \end{matrix}$  Coerebidae (2)

*Ramphastos osculans*

*Ramphastidae.*

Two individuals collected from the same flock, May 9, were in almost the same stage of tail molt.

Ten rectrices. Molt from outside in.

Specimen A. Central, 2nd and 3rd pairs, old, unshed.

4th pair, blood sheath of 28 mm.

5th pair, growing 98 mm.

Specimen B. Central, 2nd and 3rd pairs, old, unshed.

4th pair, growing 59 mm.

5th pair, growing 106 mm.



In both birds the mode of molt of the primaries traveling outward had reached the 5th pair. That of the secondaries moving inward, had caused the renewal of eight feathers.

*Pteroglossus inscriptus**Ramphastidae.*

Bird collected May 6th.

Ten rectrices. Molt from the outside in.

Central pair, just shed.

2nd pair, one-half grown, 44 mm.

3rd pair, growing, 84 mm.

4th and 5th pairs, new, full-grown.

*Selenidera gouldii**Ramphastidae.*

Birds shot May 1st.

Ten rectrices. Molt from the outside in.

Central and 2nd pairs, old, unshed.

3rd rectrice (left), just shed.

3rd rectrice (right), blood sheath,  
4 mm.

4th and 5th pairs, new, full-grown.

*Celeus undatus**Picidae.*

Bird shot May 6th.

Twelve rectrices, ten functional, and an outer vestigial pair 20 mm. in length. Molt from the outside in.

Central and 2nd pairs, old, unshed.

3rd pair, blood sheath just appearing.

4th pair, growing, 36 mm.

5th pair, almost full-grown.

6th pair, full-grown.

*Dendrocolaptes certhia**Dendrocolaptidae.*

Bird collected May 8th.

Twelve rectrices. Molt from the center out.

Central pair, new, full-grown.

2nd pair, nearly grown 96 mm.

3rd pair, blood sheath, 16 mm.

4th, 5th and 6th pairs, old, unshed.

*Picolaptes layardi*

Dendrocolaptidae.

Bird collected May 6th.

Twelve rectrices. Molt from the center out.

Central, 2nd and 3rd pairs, new, full-grown.

4th pair, one-half grown.

5th pair, blood sheath, 19 mm.

6th pair, old, unsheath.

*Pipra leucocilla*

Pipridae.

Bird collected May 3rd.

Twelve rectrices. Molt nearly complete; probably like that of the following species.

Central, 2nd and 3rd pairs, new, full-grown

4th pair, nearly full-grown.

5th pair, one-half grown, 18 mm.

6th pair, one-third grown, 8 mm.

*Pipra opalizans*

Pipridae.

Two individuals collected on May 8th and 9th.

Twelve rectrices. Molt about the same stage in both. The second and third pairs are shed first and simultaneously; next the central, and then in succession the 4th, 5th and 6th pairs. This unexpected type of molt received confirmation from the fact of its occurrence in two individuals shot on successive days, in different parts of the Utinga jungle.

*Specimen A.* Juvenile male (Fig. 17).

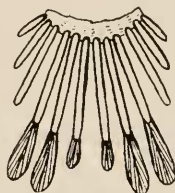


FIG. 17. TAIL OF MANAKIN

All twelve rectrices were blood sheaths, only the central, 2nd and 3rd pairs having broken through.

Central pair, 9 mm.  
 2nd pair, 11 mm.  
 3rd pair, 11 mm.  
 4th pair, 6 mm.  
 5th pair, 4 mm.  
 6th pair, 2 mm.

Both wings were exactly alike.

Primaries molting outward; 1st to 5th pairs new.  
 6th pair nearly grown.  
 7th pair three-quarters grown.  
 8th pair blood sheath, 7 mm.  
 9th and 10th pairs, old, unshed.

Secondaries molting inward; outer pair nearly grown.  
 2nd pair, blood sheath, 11 mm.  
 3rd pair, etc., old, unshed.

*Specimen B.* Adult male.

All twelve rectrices were blood sheaths, just breaking through.  
 The sheaths all averaged 6 mm. in length.

Total Length	
Right	Left
11 mm.—1st	—11 mm.
14 mm.—2nd	—15 mm.
13 mm.—3rd	—14 mm.
11 mm.—4th	—12 mm.
7 mm.—5th	— 8.5 mm.
7 mm.—6th	— 8 mm.

In these specimens the very specialized, opalescent crest feathers were in full molt, almost all of them ensheathed. These sheaths were slender, conical, pointed and lightly fluted. The general appearance of the ensheathed crown feathers was of a mass of obliquely lying, parasitic cocoons on a caterpillar.

*Platypsaris minor*

*Cotingidae.*

Bird collected May 8th.

Twelve rectrices, all old, unshed.

Wings in full molt, both wings the same. Old feathers rufous buff; new ones black, with white basal spots.

Primary molt 1-2-3-4-10-5-6-7-8-9.

Secondary molt, outer to 4th pair.

5th pair inward and 12th pair outward,  
meeting about the 8th.

Primaries, Inner, 2nd, 3rd and 4th pairs, new, full-grown.

5th pair, nearly full-grown  
54 mm.

6th pair, just breaking sheath,  
20 mm.

7th, 8th and 9th pairs, old rufous  
feathers.

10th pair, new, full-grown.

Secondaries, outer pair, nearly grown, 52 mm.

2nd pair, short sheath, 4 mm.

3rd and 4th pairs, old, rufous feathers.

5th, 6th and 7th pairs, new, full-grown.

8th pairs, short sheath, 8 mm.

9th pair, etc., new, full-grown.

*Attila brasiliensis*

*Cotingidae.*

Bird collected May 1st, juvenile.

Twelve rectrices, molt apparently 3-1-2-4-5-6. Old feathers, worn, brown almost rufescent; new ones brownish black.

3rd pair, growing, 40 mm.

1st pair, growing, 21 mm.

2nd pair, blood sheath, 8 mm.

4th, 5th and 6th pairs, old, unshed.

Primaries molting outward, six pairs renewed.

Secondaries show no molt.

*Cyclarhis gujaranensis*

*Vireonidae.*

*Specimen A.* Bird collected May 1st, female.

Twelve rectrices. Molt from the center out.



left wing, outer, 2nd, 3rd and 4th, new, full-grown.

5th, old, unshed.

6th, blood sheath, 7 mm.

7th, blood sheath, 17 mm.

8th and 9th, new, full-grown.

*Chlorophanes spiza*

*Coerebidae.*

Bird collected May 5th.

Ten rectrices. Molt 1  $\left\{ \begin{array}{l} 2-4 \\ 3-5 \end{array} \right.$

Central pair new, full-grown.

2nd pair	} full grown
3rd pair	
4th pair	} old, unshed.
5th pair	

*Thraupis episcopus episcopus*

*Tanagridae.*

*Specimen A.* Bird collected May 9th. Fledgling, male, first day after leaving nest.

Twelve rectrices well grown, and apparently of equal length.

#### Measurements

<i>Fledgling</i>		<i>Adult</i>
19 mm.—	Central—	64 mm.
23 mm.—	2nd	—65 mm.
23 mm.—	3rd	—65 mm.
25 mm.—	4th	—66 mm.
23 mm.—	5th	—66 mm.
21 mm.—	6th	—65 mm.

*Specimen B.* Bird collected May 1st, male.

Twelve rectrices. Molt from the center out. The whole web of the new feather is blue, stronger on the outer web. Old feathers are black on the inner web, greenish on the outer.

Central pair, new, full-grown.

2nd pair, still growing, 6 mm. shorter than 1st.

3rd pair, unbroken blood sheaths.

4th (right), sheath just appearing.

4th (left), not yet shed.

5th and 6th pairs, old, unshed.

*Ramphocelus carbo carbo*

*Tanagridae.*

*Specimen A.* Bird collected May 1st, male.

Twelve rectrices. Molt from the center out.

Central and 2nd pairs, full-grown.

3rd and 4th pairs, just drying up.

5th and 6th pairs, not quite full-grown.

*Specimen B.* Bird collected May 5th, adult male.

Tail in full molt, from the center out.

Central and 2nd pairs, new, full-grown.

3rd, 4th, 5th and 6th pairs, all with 13 mm. sheaths, but total length steeply graduated.

Primaries molting outward, two outer pairs still growing.

Secondaries molting inward, three outer pairs full-grown, next three in active growth.

*Tachyphonus surinamus insignis*

*Tanagridae.*

*Specimen A.* Bird collected May 2nd.

Twelve rectrices in full molt from the center out, with unusually long time hiatus between the central and 2nd pairs.

Central pair, new, full-grown, 72 mm.

Outer five pairs all with 11 mm. sheaths.

Total lengths 2nd pair, 69 mm.

3rd pair, 54 mm.

4th pair, 40 mm.

5th pair, 31 mm.

6th pair, 25 mm.



Wing molt nearly complete; primaries outward, secondaries inward.

*Specimen B.* Bird collected May 5th.

Tail completing molt from center out.

#### PART VI.—ANNOTATED LIST OF BIRDS OBSERVED.

##### A. BIRDS OF THE WILD CINNAMON TREE.

###### *Columba speciosa* (Gmel.) SPLENDID PIGEON.

Three were observed on May 2nd, one in the tree feeding on the berries, the others on adjoining branches. They flew at once when I walked past beneath.

###### *Urubitinga urubitinga* (Gmel.) BRAZILIAN BLACK EAGLE.

Twice in the same day this bird visited the trail near the tree, once perching rather low in the jungle and remaining motionless. An hour later it returned and alighted on one of the lower branches of the tree itself, preening its feathers and paying no attention to the small birds scolding from the shelter of the thick foliage to which they had fled. A specimen secured had a large green, blue, red and yellow mantis with a hundred or more of its eggs in his crop.

###### *Ictinia plumbea* (Gmel.) PLUMBEOUS KITE.

Early on May 11th at a time when there were only three or four small tanagers in the tree, this bird suddenly appeared. I had stopped watching for a few minutes to rest my fatigued muscles, and on looking up I saw this hawk perched in the tree on a branch, so slender that it was still swaying from the impact of his alighting. He seemed to be picking at something on the branch beside him, but flew at once when I fired, apparently quite uninjured by the small shot which I had to use. I then found that he had been devouring a snail of large size in its shell (*Strophocheilus oblongus*).

*Brotogeris tuipara* (Gmel.). TUIPARA PARRAKEET.

Quite common in families or small flocks. Twice observed in the tree feeding on the berries, and one which I secured had twenty-three in its crop. The noisiest birds hereabouts. While sitting at the foot of the tree, half an hour would seldom pass without a pair or more of these parrakeets dashing past high overhead, screeching loudly. Other trees seemed to offer more permanent attraction than this one. They showed little fear and members of their flocks could be shot one after the other without frightening the remainder. In the evening they collected in flocks of thirty or forty and circled about high in the air before setting off steadily south-westward toward some distant roost.

*Pionus fuscus* (Müll.). DUSKY PARROT.

A pair alighted in the tree on May 4th and remained for five minutes before flying off in the direction of the toucan tree. I heard them now and then in other parts of the jungle but did not again catch sight of one.

*Phaethornis ruber ruber* (Linn.). RED-VENTED HERMIT.

The most abundant hummingbird. Two females spent much of their time searching surrounding heliconia blossoms for tiny insects and resting from time to time on a lower branch of the tree.

*Florisuga mellivora mellivora* (Linn.). GREAT JACOBIN  
HUMMINGBIRD.

*Thalurania furcata furcatoides* Gould. AMAZONIAN  
WOOD-NYMPH.

*Heliothrix auriculata phainolaema* Gould. GREEN BREASTED  
FAIRY.

These three species of hummingbirds were observed perching in the tree on several occasions. Two others were not secured and could not be identified by the glass.

*Ramphastos monilis* Müll. RED-BILLED TOUCAN.

In the cinnamon tree the visit of this large red-billed toucan was very evidently accidental as the berry-bearing branches were too slight to support his weight. I saw one on May 3rd, resting only for a moment before he flew on in the direction of the toucan tree. When the afternoon's rain was over, the yelping cries of these birds were the most conspicuous sound of the jungle.

*Pteroglossus bitorquatus bitorquatus* Vig. DOUBLE-COLLARED ARACARI.

Twice observed in the cinnamon tree, and still oftener in the toucan tree. From a flock of eight secured two. Brilliant as these birds are, it is remarkable how easily they escape observation when in the tree-tops. Even when one of a flock is discovered, the closest scrutiny with powerful glasses fails to reveal the remainder, until one by one they move and betray their whereabouts. When motionless they resemble an irregular knot or bunch of leaves. When the broken stub of a branch contains water, they all visit it in turn, drinking after eating a half dozen or more berries.

Colors: iris pale yellow, with a antero-posterior extension of dark brown pigment, giving the pupil an elongated appearance. Bare skin around eye blue, lower lid orange yellow; facial skin same red color as feathers of nape; upper mandible lemon yellow, whitish near base and at tip, black along cutting edge; lower mandible black on terminal two-thirds, greenish-white near base and along ventral line; legs and feet yellow green like the flank feathers.

*Pteroglossus inscriptus inscriptus* Swains. LETTERED ARACARI.

An occasional visitor to the tree, and when a flock of them came, they made such a commotion that callistes and other small birds could hardly get a foothold. Four out of a flock of five were shot about fifty yards from the tree and the following day the survivor remained near, through most of the hours of day-

light, calling, and now and then feeding on the berries. The first bird shot was a young one and the rest actually followed it to within ten feet of where four of us were standing. Even after the third shot, the fourth bird came as boldly as ever in answer to the yells of the youngster. Bates and other writers speak of being mobbed by toucans in much the same manner.

Of the four birds, two were males, two females. The young molting male had the iris scarlet; crown above eye pale caerulean blue; eyelid, lores, beneath eye and around ear dark livid blue; broad line between eye and ear vermillion; skin back of nostrils bright blue; bill bright orange yellow and black; legs and feet sage green similar to the under tail web. The crop was filled with round, black seeds, which stained everything an indelible dark blue.

*Selenidera maculirostris gouldii* (Natt.). GOULD'S TOUCANET.

The commonest toucan in the tree, observed on four separate occasions in pairs or trios, but remaining only for a short time and very wary. The iris is lemon yellow above and below, shading off in front and behind into green, which changes to black next the pupil, giving it an extremely flattened, elongate appearance; bill black and white, with the terminal parts of both mandibles pale green; facial skin yellowish and bluish green; legs and feet bluish-green.

*Celeus jumana jumana* (Spix). SPIX'S AMAZONIAN  
WOODPECKER.

On May 3rd a single bird hammered at a soft place in the bark of the tree for five minutes, then caught sight of me beneath and fled silently.

*Celeus undatus multifasciatus* (Malh.). WAVED WOODPECKER.

Observed by Cherrie in the tree on May 5th. Had been eating berries.

*Campephilus trachelopyrus* (Malh.). MALHERBE'S BLACK  
WOODPECKER.

Late in the morning of May 6th a pair alighted on the trunk ten feet from the ground and worked their way upward to the small branches before flying off through the jungle. A female collected some distance away had the iris pale orange, bill greenish horn, darker along the culmen; legs and feet deep olive green. Crop filled with large yellow seeds.

*Picumnus aurifrons* Pelz. AMAZONIAN GOLD-FRONTED PICULET.

While watching a flock of *Dacnis* in the tree early in May, I noticed three small birds which at first glance reminded me of nuthatches. I secured two and found they were curious soft-tailed woodpeckers or piculets. Whether they came for berries or in hope of insect food I cannot say and I did not again have opportunity to observe them. The third bird remained motionless in a neighboring tree for some time. Pará is a new locality for this group, but these individuals seem to be quite typical.

*Thamnophilus amazonicus* Scl. SCLATER'S AMAZONIAN  
BUSH-SHRIKE.

While having no real right in an arboreal fauna I must include this species, as a male bird flew up from the underbrush when I shot at it and missed, and alighted for a moment on one of the lower branches. With several other species it was not uncommon in the surrounding jungle.

A few yards from the tree a little earlier in the day, I had stalked the same individual in thick underbrush, where it seemed to be at odds with a white-breasted manakin. After the latter flew off, the Bush-Shrike kept constantly in one place, close to the ground, singing every thirty of forty seconds. It was a simple refrain *whut! whee-whee! whee-whee! whee-whee!* When startled it uttered the *whut!* alone. It was difficult stalking ground but only a loud crackle of leaves made the bush-shrike shift its perch. The female appeared for a moment and the male repeated his song twice very rapidly, and turning close

to her ruffled all his feathers, making himself into a perfect ball, blatantly displaying the usually concealed white patch, and with the spotted shoulders protruding conspicuously from the round, slate-colored mass. Keeping thus inflated he hopped around and around on his perch, completing a half turn at each hop, stopping for a second or two between hops and twisting so as to face her. At this time his song came irregularly. Twice he began it while on the hop, but did not end it. The moment the female slipped away, all his excitement ceased and he went hard at work on his never ending ditty. Once the shadow of a passing vulture fell upon him and cut short the refrain, but only for a moment. Great metallic bees buzzed close about the singer but were not noticed. I later found his crop crammed with small black ants.

*Xenops genibarbis genibarbis* Ill. WHISKERED RECURVED-BILL.

One seen on the tree, and once shot in the depths of the Utinga jungle.

*Glyphorhynchus cuneatus cuneatus* (Licht.). WEDGE-BILLED  
WOODHEWER.

The commonest woodhewer hereabouts, and observed almost every day on the tree, moving creeper-like up and around the trunk. The slightly upward curve of the beak gives to the bird a decidedly nuthatch profile. This species seemed about to nest and two females would have deposited eggs within a very few days. Its low, plaintive note often revealed its presence before it was seen.

*Xiphorhynchus guttatus eytoni* (Scl.). EYTON'S FULVOUS-  
THROATED WOODHEWER.

A pair of these large woodhewers were courting, a process which seemed to consist in the constant pursuit of one by the other. This took place along the trail on which the tree grew, and the birds alighted again and again in the tree but not to feed. After resting a moment, panting, they continued their endless



chase. They were silent and only when the pursuer almost caught up did the other utter a sharp, querulous note. So fast did they fly that the two brown bodies would appear like streaks shooting in and out of the tree-trunks. As they were seen in the trail every day their nesting site was doubtless not far off.

*Xiphorhynchus pardalotus* (Vieill.). CHESTNUT-RUMPED  
WOODHEWER.

Seen only once and secured from one of the higher branches of the tree.

*Dendroplex picus picus* (Gmel.). PICINE WOODHEWER.

Next to *Glyphorhynchus* the commonest woodhewer seen near the tree. Once only did one alight on it, but others were seen constantly on the adjoining trunks. Owing to the large amount of white it was the most conspicuous of these birds. Several times I saw one alight crossways on a branch, the first time I have ever seen a woodhewer assume this passerine position.

*Picolaptes layardi* Scl. LAYARD'S WOODHEWER.

*Dendrocolaptes certhia certhia* (Bodd.). BUFFON'S BARRED  
WOODHEWER.

I saw neither of these species but I examined specimens in the flesh shot from the tree by Mr. Cherrie in my absence.

*Rhynchocyclus sulphurescens* (Spix). SULPHURY FLATBILL.

Abundant in tree. A dozen could have been shot at each period of observation, had I wished them. An adult and a young male which were secured were both feeding on the tree berries. The latter was in very much worn juvenile plumage and about to moult.

*Rhynchocyclus poliocephalus sclateri* Hellm. SCLATER'S  
FLATBILL.

A male collected in the tree on May 10th had both tree berries and small Diptera in its crop.

*Mionectes oleagineus oleagineus* (Licht.). OILY FLYCATCHER.

This was the commonest flycatcher which frequented the tree. I secured six and could have shot twenty on any of the days when I was on watch. Its bright buff breast rendered it one of the easiest birds to recognize, and after a day's observation I shot none by accident. Their food consisted both of tree berries and small insects.

*Tyranniscus acer* (Scl. and God.). SHARP-BILLED FLYCATCHER.

These little flycatchers were rather rare and usually early comers. I secured none after seven-thirty in the morning, and even then they had been feeding for some time. Those collected in the tree had fed altogether on the tree berries. They were breeding at this season. Even with my powerful field glasses, and with knowledge of the points of difference it was absolutely impossible to distinguish this species from either of the preceding forms of *Rhynchoyclus*. When eighty feet or more up, I do not think identification with glasses of these lesser flycatchers can be accomplished.

*Elaenia flavogaster flavogaster* (Thunb.). YELLOW-VENTED  
CRESTED FLYCATCHER.

Observed several times in the tree feeding on the berries. It kept lower down than the other smaller species and was recognizable by its clean-cut, white markings.

*Elaenia gaimardii guianensis* Berl. GAIMARD'S CRESTED  
FLYCATCHER.

Only among the top-most branches with other small Flycatchers. On two occasions when seen against a mass of dense foliage I detected the half-concealed, white crown, but usually the species merged wholly with the *Rhynchoyclus* and *Tyranniscus* feeding with it. It was feeding wholly on the tree berries.

*Myiarchus tuberculifer* (Lafr. and D'Orb.). D'ORBIGNY'S  
BLACK-HEADED FLYCATCHER.

This was the only species of flycatcher which ever got in the least excited over my presence at the foot of the tree. As I was getting into position for a prolonged period of observation, one or a pair of these birds would occasionally drop down from the upper branches and with crest raised, excitedly flutter from one branch to another uttering a continual sharp *tsip! tsip!* While the berries were eaten by all I examined, yet insects were never wholly absent, and more than once I saw birds of this species launch out high above the tree after passing insects. When seen against green foliage, even at a great height, the distinct areas of grey and yellow on the lower plumage were quite distinct.

*Empidonomus varius* (Vieill.). AZARA'S FLYCATCHER.

A specimen in worn plumage shot from the tree and three others near by. All must have been in the tree during the morning as all had tree berries in their crops.

*Pipra fasciicauda* Hellm. BANDED-TAILED MANAKIN.

Several times I had watched orange and black manakins in the lower branches of the tree and supposed they were the common red-headed species (*Pipra rubricapilla*). It is very probable that most of them belonged to that species, as all which Cherrie and I secured in the neighborhood of Utinga were *rubricapilla*. The single bird which I secured from the tree was the banded-tailed manakin. In its crop were two small beetles and seven tree berries.

*Pipra erythrocephala rubrocapilla* Temm. RED-HEADED  
MANAKIN.

The commonest manakin at Utinga. Early every morning a male would be perched on the same branch of the tree and

twice I saw him driven away by other manakins. He never fed while I watched him, but sat sometimes for fifteen minutes without moving, paying no attention even to the sound of the gun or of the shot as it returned and swished through the leaves after I had fired a shot straight upward.

*Pipra leucocilla bahiae* Ridgw. SLATE-BREASTED BLACK  
MANAKIN.

Next to the red-crowned this manakin was most frequently seen. It was a female of this species which, with a male opal-crowned manakin, I secured from the tree with one shot. They had united to chase away the red-crowned bird from his perch and at once had flown upward beyond the usual height at which these birds are found. In the upper branches they joined a small flock which had come out of the jungle, and which soon left the tree and went on toward the north.

*Pipra suavissima* Sol. and God. ORANGE-BELLIED MANAKIN.

After a flock of roving jungle birds had left the tree I secured this specimen from their number. It had two tree berries and a great mass of insect larvae in its crop. I did not observe it again during my stay.

*Pipra opalizans* Pelz. PARA OPAL-CROWNED MANAKIN.

The female which I secured was in an adjoining tree, but only about twenty feet from the cinnamon tree, and within half an hour the small flocks of manakins appeared from which I got the male bird. There were five berries in the crop, which otherwise was empty. A day or two before seven or eight of these beautiful birds had been secured for Mr. Cherrie two miles away, by a native collector. Aside from these examples we saw nothing of the species.

*Piprites chlorion* (Cab.). SCHOMBURGK'S MANAKIN.

Shooting at what I took to be a flycatcher of some new species I secured a female of this species from one of the lower

branches. It had been hopping about for some time in the neighboring jungle and its crop contained only small insects. It was quite alone and I saw nothing, nothing of its mate or of other individuals.

*Chiroxiphia pareola pareola* (Linn.). BLUE-BACKED MANAKIN.

Twice seen and one male secured. On May 5th a male had been flying back and forth for some time before I gave it careful attention. Although well above the ground, it showed its crown and back so distinctly that I knew it at once, and watched it through the glasses snatching berries and chasing some species of *Dacnis* through the branches.

*Chiromachaeris manacus purus* Bangs. EASTERN WHITE-BREASTED MANAKIN.

Although a day seldom passed when I did not see this species near the tree, it was only on the last day of observation that I saw it actually in the tree itself. Two manakins of unknown species were having a most excited time in the lower branches and making all the noise of which they were capable. The uproar drew two male white-breasted manakins from the jungle undergrowth and they flew up without hesitation to see what the matter was. When they reached the branch the row soon ended and all concerned sought privacy again. A pair was always to be found about one hundred yards from the tree on the edge of the jungle where an old cultivated field had grown up to dense briery undergrowth. A second pair must have had a nest within ten or fifteen yards of the trail, although most careful search failed to locate it. While sitting quietly near the tree the female often came close and peered at me, hopping from twig to twig, and at each flight producing the characteristic deep, low *whirrrrrrrrrr!* the wing song by which these little jungle people give vent to their emotions—courtship, suspicion, fear.

*Tityra cayana* (Linn.). CAYENNE TITYRA.

One of these birds perched for some time in a tree close to our house on the first day of our stay at Utinga. I saw no more

of the species until I found that late in the afternoon just after the rain or even while it was still falling, three of these tityras came to the tree regularly in company with one or two Cotingas. I saw them under these conditions on three separate occasions and watched them feeding on the berries at leisure.

*Tityra inquisitor erythrogenys* (Selby). RED-CHEEKED TITYRA.

One early in the morning of May 6th. Not seen again.

*Platypsaris minor* (Less.). LITTLE PSARIS.

At seven A. M. on May 6th the cinnamon tree seemed almost deserted. I arranged my canvas chair and lying back, searched the upper branches carefully with my glasses for signs of life. Suddenly I saw motion in the tip of what I had thought was a broken branch stub. Several minutes passed and as I could make nothing of it, I secured it and found it to be a female psaris. It had evidently been feeding elsewhere as well, as the stomach contained a large yellow seed and a green grasshopper, while in the crop were three tree berries.

*Pachyrhamphus rufus* (Bodd.). CINEREOUS THICKBILL.

Twice I observed the unmistakable female of this species feeding in the tree, but was unable to secure it. On the following day we shot a specimen some distance away. Its only food was hairy caterpillars. It seems a silent, quiet bird, slow in movement and stupid in taking alarm at the warning cries or flight of other birds.

*Pachyrhamphus marginatus* (Licht). LICHTENSTEIN'S  
THICKBILL.

Quite ignorant of what I was shooting at, I secured a female of this thickbill from the very top of the tree where it was feeding in company with callistes and flycatchers. It had breakfasted on a spider and several tree berries.



*Lathria cinerea* (Vieill.). GOLD BIRD.

The gold or greenheart birds as they are known in Guiana, were found in the Utinga jungle, isolated as usual, vague calling Voices, penetrating and ventriloqual. A great fig ten yards from my cinnamon tree was a favorite perch of one of these birds and twice or more each morning it came to the berry tree to snatch a mouthful of the fruit and dash back again. It would utter its call the moment it alighted, but I never heard it given elsewhere than from this perch in the dense heart of the great fig tree.

*Attila brasiliensis* (Less.). SCHOMBURGK'S ATTILA.

While observing this species and after I had secured a specimen I supposed I was dealing with some unknown form of flycatcher, although I had never known any member of the Tyrannidae with such a marvellous vocabulary as had these birds. Two individuals, one adult and a young male, were in the tree early on the morning of May 1st and ultimately I secured the latter and identified the species. They were exceedingly active and playful. The full-grown young bird would approach its parent, fluttering its wings and begging for food, then being chased swiftly through the jungle and back again, or swinging around, would pursue the other in turn. The song, which was uttered every ten or fifteen seconds was exactly alike in the two birds. It was a high, liquid four note phrase, *wheelde-wheelde-wheelde-wheelde!* Four rapid repetitions was the rule, more rarely increased to five or six. But this was constantly varied from the more usual timbre. When uttered while in pursuit of one another it became higher and shriller, or when given as the overgrown youngster was swallowing a berry it was fairly gargled. Again only a single *whee!* would be uttered, standing for some unknown emotion. At least a score of variations or shades of utterance were heard in fifteen minutes. The note of suspicion or alarm, given when I made too loud a noise or when another bird or a squirrel alarmed them, was very different, a loud, sharp, woodpecker-like cackle. After this was uttered once or twice, during which time the birds were motionless, the wheelde call or song commenced, the Attilas becoming at once active.

They kept to the tree-tops and only by a quick, long-distance shot was I able to secure the young bird. The iris was pale hazel-brown; upper mandible horny black; lower also, with a large, fleshy-white patch mid-way along the rim on each side. The inner gape showed the loose yellow skin so characteristic of young birds; legs and feet slaty-blue; soles yellowish-flesh; claws dark brown.

The most unexpected fact was in connection with its food. The crop was full of berries and there were two which had not yet been swallowed, but in the gizzard were the recognizable remains of a small fish. The only way I can account for this unusual item of diet is that the birds must have been drinking at a jungle pool near by in which were many small minnow-like *Tetragonopterus*, and the young bird in some way had managed to seize and swallow one.

*Cotinga cayana* (Linn.). CAYENNE CHATTERER.

Once or twice these brilliant birds were seen in the mango trees near our house, but like the tityras I did not see them elsewhere than in the cinnamon tree in late afternoons. There were usually two, one in full color and the other a female or young bird. Their brilliance absolutely disappeared when seen against the bright sky, but in contrast with the green leaves or a cloud, lighted by the slanting rays of the sun, they flashed like great gems.

*Thryothorus genibarbis genibarbis* Swains. SWAINSON'S

MOUSTACHED WREN.

For two days in succession a pair of these birds remained in the neighborhood of the tree, occasionally visiting the lower branches, but only momentarily and, as far as I could judge not touching the berries, but intent only on insect prey. One made occasional attempts at song, but the season was evidently past or had not yet arrived.

*Troglodytes musculus clarus* Berl. and Hart. VENEZUELAN  
HOUSE WREN.

This is, of course, not a bird of the jungle and its presence in the tree was accidental, and as far as my observation went occurred only once. The bird seen was doubtless one of a pair which lived in and about the clearing about our house, and made deeper foraging inroads now and then into the jungle. It was probably the number and commotion of the small callistes and other birds feeding in the tree which drew the inquisitive wren thither early in the morning on May 6th.

*Planesticus phaeopygus phaeopygus* (Cab.). CABANIS'S WHITE-  
THROATED THRUSH.

Not uncommon in isolated pairs through the jungle, and an occasional visitor to the tree especially in late afternoons. They went about feeding in a business-like manner, apparently filling their crops in a short time. The nesting season for them had just begun.

*Vireo chivi* (Vieill.). CHIVI VIREO.

At 8 A. M. on May 5th I secured this bird from the upper branches of the tree, not knowing at what I was shooting except that it had a different carriage from the flycatchers and dacnis which thronged the upper foliage. Four tree berries were in its crop and a fifth still unswallowed in the mouth.

*Pachysylvia thoracica semicinerea* (Scl. and Sal.). GREY-NAPED  
WOOD VIREO.

*Cyclarhis gujanensis gujanensis* (Gmel.). GUIANA VIREO-  
SHRIKE.

I secured these birds within ten minutes of one another on May 2nd. Both were feeding on the berries of the tree.

The previous day we had shot elsewhere an adult male vireo-shrike and a young male of the year in very worn plumage. Comparison of these two showed the following differences:

	<i>Adult</i>	<i>Juvenile</i>
Length .....	147	143
Culmen .....	16	15
Culmen from nostril .....	10	9
Wing .....	70	65
Tail .....	55	55
Tarsus .....	20	21
Middle toe and claw .....	16	17

Bill: adult reddish horn; juvenile slaty grey; tips in both whitish.

Legs and feet: adult brownish blue; juvenile clear slaty blue.

Iris: adult reddish orange; juvenile hazel, paling outwardly.

Bare facial area: adult warm flesh; juvenile olive green.

Forehead: adult rich chestnut; juvenile grey like head.

Superciliary: adult rich chestnut; juvenile warm buff.

*Cyanocompsa rothschildii* (Bartl.). ROTHSCHILD'S BLUE  
GROSBEAK.

I saw this bird on two occasions feeding on the berries of the tree, although it was probably the same individual. The second time it descended to one of the lower branches and remained motionless for many minutes.

*Saltator maximus* (Müll.). GREAT SALTATOR.

Saw but one of this species in the tree and that quite an accidental visitor as it perched only for a few seconds on a lower limb and then flew straight off through the jungle. Two days later we secured a specimen a mile away, but saw no others during our stay.

*Coereba chloropyga chloropyga* (Cab.). BRAZILIAN  
FLOWERPECKER.

A few of these little birds were seen almost every day in the tree usually well up near the top, but unlike most of their

companions feeding apparently altogether on small insects. The first one which I saw in the tree was on a lower branch by itself, singing with all its might. Its song was sweet, rather short and of a wheezy character with a quaint little lilt. This in spite of the fact that it was in very worn, shabby breeding plumage.

*Dacnis cayana cayana* (Linn.). TURQUOISE HONEY-CREEPER.

These exquisite little birds were one of the most abundant species which frequented the tree. I saw at least fifty during each period of two or three hours of observation. All which I secured were feeding on the berries. They usually kept to the upper branches, flying swiftly from the surrounding jungle summits, and moving actively about, now and then catching an insect but preferring the tree berries. This was the only species of the Family which ever came down to lower branches. When well up it was impossible to differentiate between this and the next species. The color of the turquoise honey-creeper is remarkable. When the bird is held between the observer and the light, no matter how oriented, whether sideways, head or tail on, it is a deep cobalt blue; when looked at with the light behind the observer, it is as intense a clear, shining turquoise. There is no position of feather or bird which will alter these colors.

*Dacnis angelica angelica* Bonap. BLACK-BACKED  
HONEY-CREEPER.

Still more active than the turquoise, this bird equalled it in numbers, and sometimes twenty were in the top of the tree at one time.

*Cyanerpes cyaneus cyaneus* (Linn.). BLUE HONEY-CREEPER.

The blue honey-creeper, perhaps the most beautiful of all this group, was much more common at the tree in the afternoon than in the morning. I was able to identify the males of these birds at any height and found them in the proportion of two in the morning to seven in the afternoon. I have counted eighteen individuals at one time. They seldom descended to the lower branches. In every specimen I examined there were a few insects in the crop in addition to the tree berries.

*Chlorophanes spiza spiza* (Linn.). GREEN HONEY-CREEPER.

The fourth member of this group, glowing with its green iridescence in the sunlight. Instead of insects these birds were plucking tree berries with their long curved beaks. They seemed equally abundant, whether at daybreak or after the daily rains in late afternoon. Eight males and two females were grouped together on one of the central branches for fully five minutes one morning, excited about something which the most careful scrutiny with my glasses failed to reveal.

*Chlorophonia chlorocapilla* (Shaw). BLUE-BACKED GREEN  
TANAGER.

This bird which appears to be new to this part of Brazil was shot accidentally. I aimed at a blue-bellied tanager in the tree, missed it, and this small, wonderfully-colored species, which I had quite failed to observe, dropped from an upper branch. It had two tree berries in the crop.

*Tanagra violacea lichtensteinii* (Cab.). NORTHERN VIOLET  
EUPHONIA.

Never present in large numbers but several pairs were sure to turn up in the tree during the day. They did not remain long, perhaps, because a berry or two must have made a cropful for such diminutive chaps. No matter how busy hopping about, they always found time every few minutes to stop and burst into their jubilant little song.

*Tanagra cayennensis* (Gmel.). CAYENNE EUPHONIA.

Decidedly rare in the tree. Saw four and secured one. Easy to identify when not silhouetted against the sky, the two lateral patches of orange feathers standing out in strong contrast with the blue black of the remainder of the plumage. The specimen which I shot had small green seeds in its crop, not those of the tree.



*Tanagrella velia signata* Hellm. PARÁ BLUE-BELLIED TANAGER.

On May 5th Cherrie shot a female of this beautiful bird from the tree and within five minutes I secured its mate. On three later occasions I observed this tanager, always in pairs and in the early morning. It could not be recognized with certainty in the upper branches as the yellow of the black was usually concealed. They fed greedily on the tree berries.

*Tangara punctata punctata* (Linn.). SPOTTED TANAGER.

Early visitors to the tree, coming singly or in pairs straight across the top of the jungle as if from a distance. They knew the tree well and began to feed as soon as they arrived. After they had eaten several berries they would appear satiated and either sit in the sun and preen their feathers or chase one another about, always returning from the surrounding jungle for another period of feeding before they left.

*Thraupis episcopus episcopus* (Linn.). WHITE-SHOULDERED BLUE TANAGER.

Blue tanagers were rare at the tree although common elsewhere, and when they appeared came singly or in pairs. I saw them there only three times. This may have been because they were nesting at this season, a pair of birds having a nest in a mango tree a few yards from our house. There were two young birds and these flew on May 8th.

*Thraupis palmarum palmarum* (Wied.). PALM TANAGER.

One bird shot in the tree in company with a flock of silverbeaks on May 8th. Its mate fed for some time afterwards on the tree berries. Although fairly common elsewhere on the borders of the jungle no more were observed in the tree.

*Ramphocelus carbo carbo* (Pall.). SILVER-BEAKED TANAGER.

The commonest bird at Utinga and almost constantly present in the tree. When large numbers of callistes and flycatchers were gathered together there would sometimes be only

one silver-beak. Then with a rustle of wings a whole flock would fly up from the surrounding jungle, twenty or thirty in all, and without actual aggression but by sheer numbers would disturb most of the smaller birds. They would chase other birds half playfully or in turn be pursued by some flycatcher, but on the whole the tree-top assemblage of birds was a peaceful one. The quickest glance served to identify these tanagers, for though their white beak might be invisible, and their plumage appear jet black viewed against the bright sky, the characteristic sideways flirting of the tail never failed. Their sharp metallic *chip!* was another positive factor of identification. They were restless, never remaining very long in the tree but flying off one after the other to work their way slowly through the jungle.

*Tachyphonus cristatus brunneus* (Spix). SCARLET-CRESTED  
TANAGER.

One specimen with a number of honey-creepers was secured in the tree early on May 2nd. Did not note another during my stay.

*Tachyphonus surinamus insignis* Hellm. PARÁ CRESTED  
TANAGER.

Three or four times I observed this bird at the tree feeding on the berries and secured two specimens. Its peculiar markings enabled me to identify it at almost any height. On May 5th a male suddenly swooped down from the upper branches and showed great agitation upon finding me in my observation chair. I soon discovered that the cause was a female and single young in the undergrowth near by, who were attracted rather than frightened by the emotion of the male. They soon took themselves off, and in a few minutes the male crested tanager was again back feeding in the tree.

*Hemithraupis guira guira* (Linn.). GUIRA TANAGER.

Early on May 5th a pair of these birds high up in the tree. One of these I secured. The other continued feeding and flying about the tree with honey-creepers and flower-peckers for some time afterwards.

*Ostinops viridis* (Müll.). GREAT GREEN CACIQUE.

A small colony of these splendid birds was established near the toucan tree, to which tree they paid frequent visits. Only once did I see one in the cinnamon tree and then only for a minute. He snatched two berries, looked carefully about him, down at me and flew off through the jungle in the direction of the colony, a few hundred yards away.

*Cacicus cela* (Linn.). YELLOW-BACKED CACIQUE.

Five times I saw these birds in the tree feeding greedily on the berries. The slenderness of the branches seemed to bother them, however, and they never remained long. They constantly haunted the toucan tree several hundred yards away, which had larger berries and stouter branches. There were three separate colonies within the radius of a half mile, the nearest only a hundred yards from the tree and from our house in the yard of a native. In certain zones of the jungle the squeaks and gurgles of these birds were the dominant sounds throughout the day.

In spite of this indescribable squeaking and yelping, the yellow-backed caciques appear to have a consistent call or song. It may be written, *yank! yank! yank-keou-ke-wonk!*

*Cacicus haemorrhous haemorrhous* (Linn.). BRAZILIAN RED-RUMPED CACIQUE.

One individual was in the tree on May 6 with four yellow-backed birds. I could not secure it but watched it for more than five minutes.

## B.—AERIAL BIRDS.

*Catharista atratus brasiliensis* (Bonap.). BRAZILIAN BLACK VULTURE.

Five minutes seldom passed, hour after hour, when one or more of these birds did not soar across the bit of sky visible above the cinnamon tree. Usually they were very high up,